

This lesson is part of a larger, comprehensive school garden guide called **Minnesota School Gardens: A Guide to Gardening and Plant Science** developed by Minnesota Agriculture in the Classroom in 2013. The entire guide is available at www.mda.state.mn.us/maitc.



Grade

Elementary 3-5

Materials/Preparation

- ☐ Teacher Material A – Plant Hardiness Zones – one per teacher
- ☐ Handout A – How Do I Know if the Plant is Right for the Spot? – one per student
- ☐ Assessment A – Right Plants, Right Place – one per student
- ☐ Writing instruments
- ☐ Colored pencils or markers (optional, for mapping)
- ☐ Map of the school grounds – one per student

Fun Fact

Lettuce varieties can be put into four main groups: romaine, butterhead, crisphead, and looseleaf. Each group has its own growth and taste characteristics.



Right Plants, Right Place

Minnesota K-12 Academic Standards

Science	3.4.1.1 5.4.1.1	Living things are diverse with many different characteristics that enable them to grow, reproduce and survive.
Science	5.4.2.1	Natural systems have many parts that interact to maintain the living system.
Social Studies	3.3.1.1 4.3.1.1 5.3.1.1	People use geographic representations and geospatial technologies to acquire, process and report information within a spatial context.

Summary/Overview

In this lesson, students learn that plants - vegetables, flowers, shrubs, and trees - should be planted with care and thought to their needs. They are introduced to annuals and perennials and the influence of climate. Students consider how variables such as shade, sun, dry or wet soil, and plant size at maturity must be considered before a gardener or farmer plants a seed or seedling.

Garden Connection

Plants need sun and water in varying amounts. The location in which a plant is placed is critical for its healthy growth.

Background Information

Where and When

Students who have not been exposed to gardening or raising plants may not know that thought needs to go into where plants are planted and grown. Plants can be ornamental and used to enhance the landscape around us, or grown for food. Even though most vegetables are raised as seasonal crops (annuals), thought must be put into where and when they are planted. Most vegetables need abundant sun, consistent soil moisture, and enough days to reach maturity before the end of the season.

Human Needs

It is important to know what we want from the plant. In a vegetable garden, we want to know what food products or crops we will be able to harvest at the end of the season. With flowering plants, do we want color throughout the season? Do we want plants that provide shade or privacy? Or that attract birds and provide fragrance?

Plant Needs

When a plant is not right for the site, it will not thrive and may be more susceptible to disease or insect attack. To prevent problems, planning must go into the selection of the plant and its needs. Some plants can tolerate both sun and shade, and will not do as well if planted in the wrong place. This lesson reinforces three important needs of plants - sun, water, and soil - and other factors: climate, growing season, and size of plant at

maturity. The amount of sun needed varies according to the plant, as will the amount of water, the soil type, and pH. However, most plants need consistent moisture and good drainage. They also need soil that is not compacted so the roots can access oxygen and water and have room to spread. Climate affects plants because it includes water, temperature, wind, and sun, and it affects the growing season, or the amount of time available for a plant to grow, develop, and mature. In a region with a very short growing season, plants that need a long time to mature may not do as well. A plant's size at maturity can be affected by its ability to get what it needs. If it doesn't get the proper nutrients, it may not reach full size. Also, if it is a large plant, it may prevent other plants around it from meeting their own needs.

Vegetables

Vegetables may be started as small transplants or seeded right out of the packet. Enough room must be given to allow for their size at maturity. As plants grow taller they cast shadows and can reduce sunlight for neighboring plants. Many plants need the entire growing season to mature.

Flowering Plants

Flowers are classified by the time it takes to complete its life cycle starting from a seed, grow into a plant, produce a new seed, and die. Annual flowers complete their life cycle in one growing season while perennial flowers grow for two or more years. Annual flowers may not be 'annual' in more temperate parts of the world. Students will be introduced to the 'hardiness zones' map and the effects of climate on how plants succeed. This map is found online and in many seed catalogs. Perennials are most successful when planted in an area similar to that from which they originated. Many books and online sources offer this information on plants, shrubs, and trees.

Houseplants

This lesson focuses on outdoor plants, especially vegetables and flowers, but these ideas also apply to a houseplant or one that sits on the windowsill of the classroom. Many houseplants are tropical plants that would never survive outdoors in Minnesota's climate. If we are away from them for a week or two, can they tolerate not being watered? Do they thrive in partial sun situations, or do they grow long and leggy and become yellow?

Green Thumb

The notion of having a green thumb is often simply the art of choosing the right plant for the conditions and maintaining the plant according to its needs. Behind every green-thumbed gardener and farmer is an interest in plants and the willingness to learn about and provide for their needs.

Objectives

- List the factors that are important to consider when selecting a plant for a specific location.
- Explain the difference between an annual and perennial.
- Describe how the plant hardiness zone map can be helpful to growers.



Procedure

Interest Approach

Selecting the right plant is a challenge. Students will learn a great deal from their surroundings by identifying plants growing in different conditions on the school grounds. Conditions can include the amount of sunlight (full sun, partial shade, or full shade), soil characteristics, moisture and drainage levels, and types of nearby plants.

Take students on a tour of the school grounds to assess the environment. Give each student a map of the school grounds on which to note their observations. Items to evaluate and activities to complete include:

Students should determine how much moisture and sunlight the planned planting area gets.

Consider drainage. Does the area hold moisture? Soil moisture is difficult to determine. To assist in student observation, follow the directions provided by the University of California, Davis titled How to Measure Soil Infiltration Rate found at http://afghanag.ucdavis.edu/natural-resource-management/soil-topics/soil-fact-sheets/FS_Soil_Infiltration.pdf.

To determine soil type, check clumps of soil. Try to decide whether it is clay-like (sticky, smooth), sandy (gritty and rough), or a combination. Make a note of the soil type you find in each location.

Students may want to draw on their maps, highlighting sunny areas in yellow, wet areas in blue, etc.

Take a walk around the school, writing down the types of plants found. Write down the names of plants if they are known. Be sure to note conditions such as moist shade, dry shade, moist sun, dry sun, and wet conditions. Create a table to keep track of findings. When done, find the total number of plants in each category.

1. Where were the most plants found? Why do you think so?
2. Where were the fewest plants found? Why do you think so?
3. Were the plants different sizes in the sun vs. in the shade? If so, why do you think that is?
4. Were the plants different sizes in places with different amounts of water? If so, why do you think that is?

Summary of Content and Teaching Strategies

Choosing the right plants for your garden is very important. This can mean choosing vegetable plants that won't get too big in a small garden, or not placing a shade-loving plant in a sunny part of your yard. Ask students if they think it is important to know how big a tree will get before you plant it and why. Next discuss whether every plant will grow in any place. Different plants need different things in order to grow well. The perfect growing location for one plant is not the perfect growing location for the next.



Have students brainstorm plant needs to consider when choosing plants for a vegetable or flower garden. Develop a list as a class. Be sure to include sun, water, soil, climate, growing season, the plant's size when it is mature, and the purpose of the plant (food, shade, beauty).

Successful farmers or gardeners must be able to answer these questions:

1. What is the right plant?
2. How do I know if the plant is right for the spot?
3. Why does it matter?

What is the right plant? Think about plants in two ways:

Plants we grow for enjoyment, usually because we like the way they look or smell, are ornamental plants. They include flowers, shrubs, and trees that may or may not grow edible fruit.

Some ornamental plants have different life cycles. Plants that only live one growing season in our climate are called annuals. Plants that grow and get bigger for more than two years are called perennials. We use both annual and perennial flowers and vegetables in the yard and garden.

Some annual flowers planted in Minnesota might live for many years if they are planted in the southern United States. This has to do with climate. With a partner, have students discuss the meaning of climate. Show Teacher Material A and discuss plant hardiness zones. The map shows the average coldest temperatures for the United States. Growers use the map to determine which plants will be most successful in their area.

Plants we grow for food are vegetables and fruits. Most vegetable crops are annuals, but some are perennials. Most fruits are perennials.

Annuals are plants that only grow for one growing season in our area. Perennials are plants that can live and grow for more than one year.

Ask students to think of an example of one annual and one perennial plant. It can be a fruit, a vegetable, a flower, or a tree. Examples of annual vegetables include peas, beans, and tomatoes. Examples of perennial vegetables include asparagus, artichokes, and rhubarb.

Provide students with the two-page Handout A. Working in groups, they determine the placement of Mrs. MacGregor's plants. The activity can be extended by asking students to list the number and color of plants by the season they will bloom. How many spring flowers will Mrs. MacGregor have? How many in summer? Most of Mrs. MacGregor's plants are perennials. Remind students that plants may get wider each year, but not necessarily taller. In a few years some will go from one small plant with one flower stem to a wider plant with many flower stems. Plant #4 (Morning Glory) is an annual. It is not expected to come back next year. However, it may have dropped seeds (reseeded) and may grow again in the same area. To ensure another morning glory plant, she needs to plant new seeds.

Review/Summary

Discuss why successful farmers or gardeners must be able to answer these questions:

1. What is the right plant?
2. How do I know if the plant is right for the spot?
3. Why does it matter?

Modifications/Extensions

Have students go to the garden location on school grounds and select three to five plants that would grow well in this location. Students prepare a poster or report explaining their reasoning.

Assign students to prepare a report in poster form related to climate and plants, using information from a variety of materials. Provide students with seed catalogs and computers with Internet access.

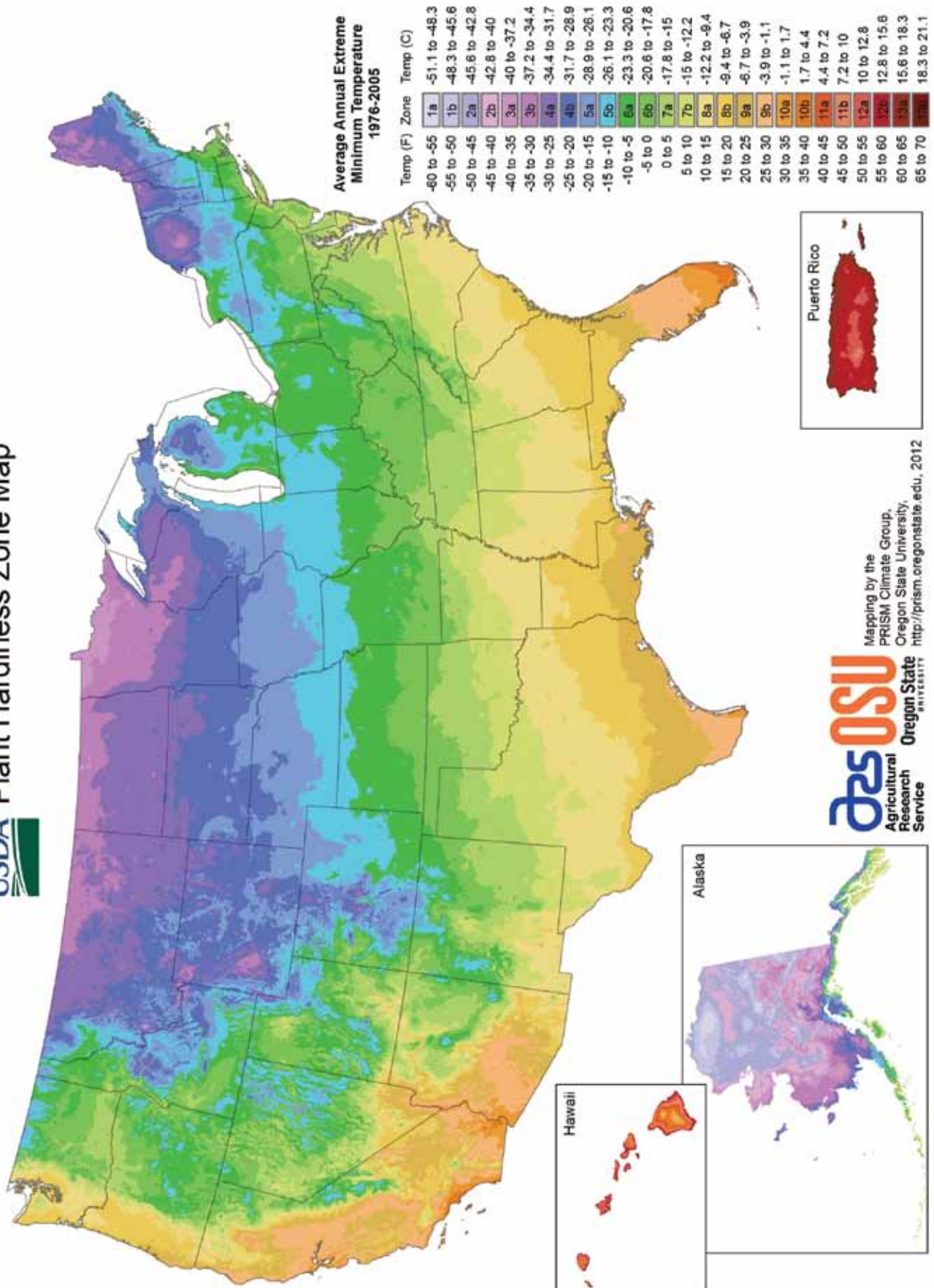
Have students label physical features on a map of Minnesota. Then have them identify the significance of geographic locations of cities in Minnesota. Consider location in relation to the climatic conditions, plant hardiness zone, topography, and other things that affect plant growth.



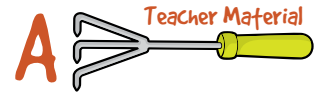
Sources/Credits

Adapted from New York Agriculture in the Classroom and Cornell University's Sciences of Life Explorations (SOLE).

USDA Plant Hardiness Zone Map



Plant Hardiness Zones

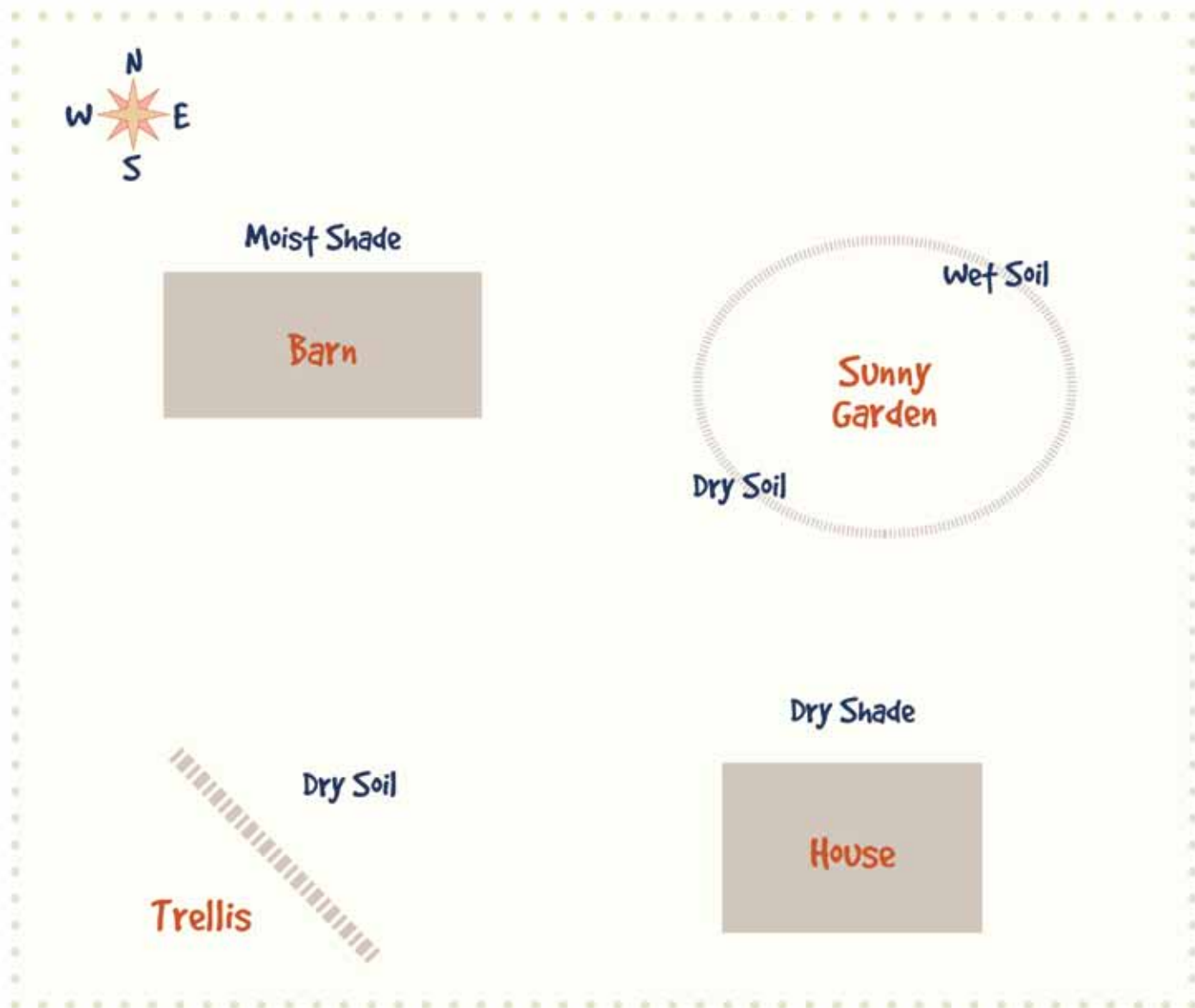


Name _____



Do I Know if the Plant is Right for the Spot?

Here's a sketch of Mrs. MacGregor's yard. She wants her new plants to grow well. On the next page, read the descriptions for each plant, then determine where to place the flowers in Mrs. MacGregor's yard. Indicate the location of the flowers by placing the corresponding number on the map. Because perennial flowers, shrubs, and trees are around for a long time, you must think carefully about where you plant them.



The yard has some shady spots and a lot of sunny spots. Some spots are moist, or wet, or dry. Mrs. MacGregor has chosen some plants that bloom in spring, some in summer, and some in fall, so she will have color in her garden all season long.

Mrs. MacGregor chose these flowers because she likes their shapes and textures. Another important reason she is adding flowers is to encourage beneficial (helpful) insects in her yard. She also wants more visits from birds and butterflies.



Name: Bluebell
Blooms in: Spring
Likes: Dry shade
Special notes:



Name: Chrysanthemum
Blooms in: Fall
Likes: Sun and wet soil
Special notes: Attracts moths



Name: Black-Eyed Susan
Blooms in: All summer
Likes: Sun and wet or dry soil
Special notes: Very sturdy!



Name: Morning Glory
Blooms in: Summer
Likes: Sun, dry soil
Special notes: Climbing vine; place on



Name: Iris
Blooms in: Early summer
Likes: Sun and moist soil



Name: Columbine
Blooms in: Spring
Likes: Shade and moist soil
Special notes: Attracts birds and bees

Name _____



Right Plants, Right Place

1. Plants that like sun can grow in the shade, too.
Will they grow as well as if they were in the sun?

☐ Yes ☐ No

2. Why is it necessary to think about how big a plant might get when we plant it?

3. What is the main difference between annuals and perennials?

4. List three basic needs that are important for a healthy plant.
